2015 Otolaryngology Update

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Hearing Loss

Tinnitus and Hearing loss are the two most common disability claims in the military.

Together, DoD and the VA spend more than $4 Billion a year on evaluation, treatment and disability payments related to tinnitus and hearing loss.

Hearing Loss

Although the financial burden and the potential for mission impact are significant, the effect on quality of life and an individual's diminished ability to "connect" with family and friends is perhaps even more significant.

Hearing Loss

Two basic types of hearing loss:

- Sensorineural
- Conductive
- Combination of sensorineural and conductive is referred to as Mixed Loss

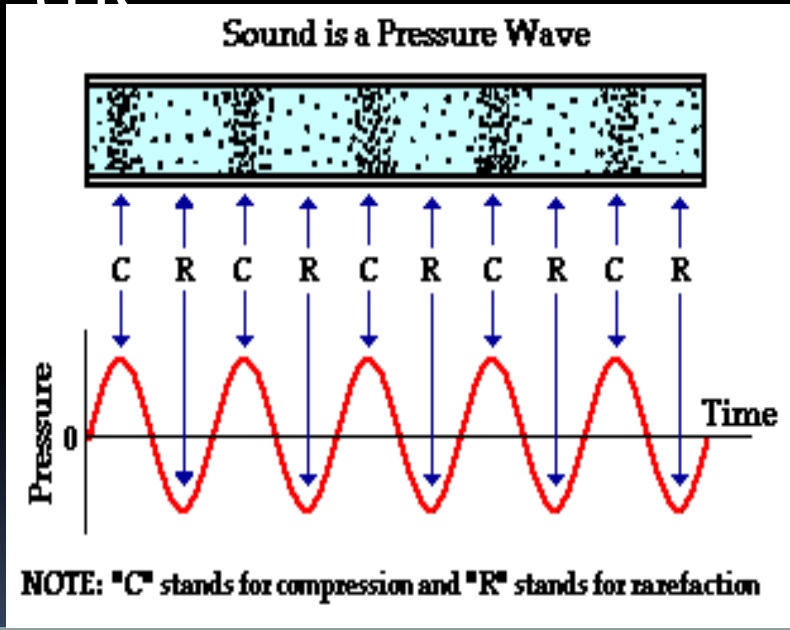
Hearing Loss

Other less common types of hearing loss are:

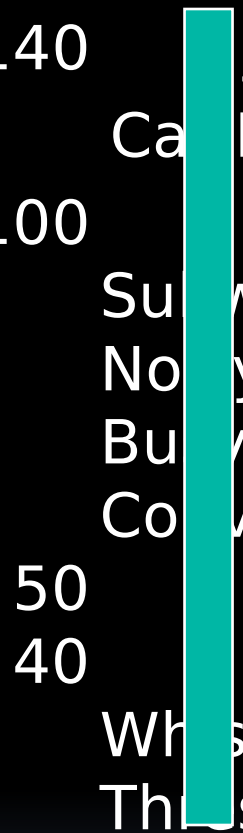
- Somatoform
- Malingering
- Central

What is sound?

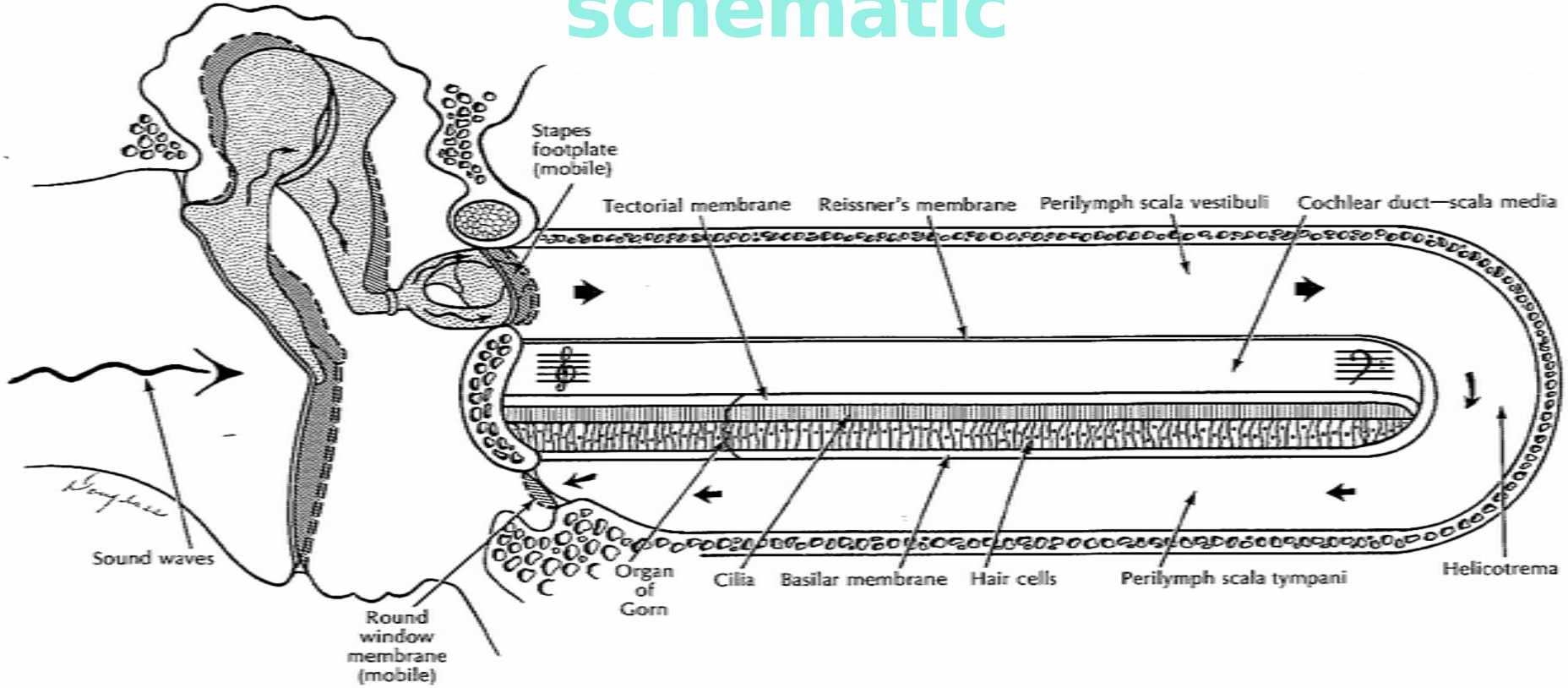
- Sound is a physical force that results in alternating movements of the molecules of air (or whatever medium is exposed to the sound).
- Measured in cycles per second, or Hertz (HZ)



dB	Source
140	Jet Engine, Gun Shot
120	Car Horn
100	Pneumatic Drill
90	Subway
80	Noisy Restaurant
75	Busy Street
65	Conversation
50	Average Home
40	Quiet Office
30	Whisper
0	Threshold of Hearing

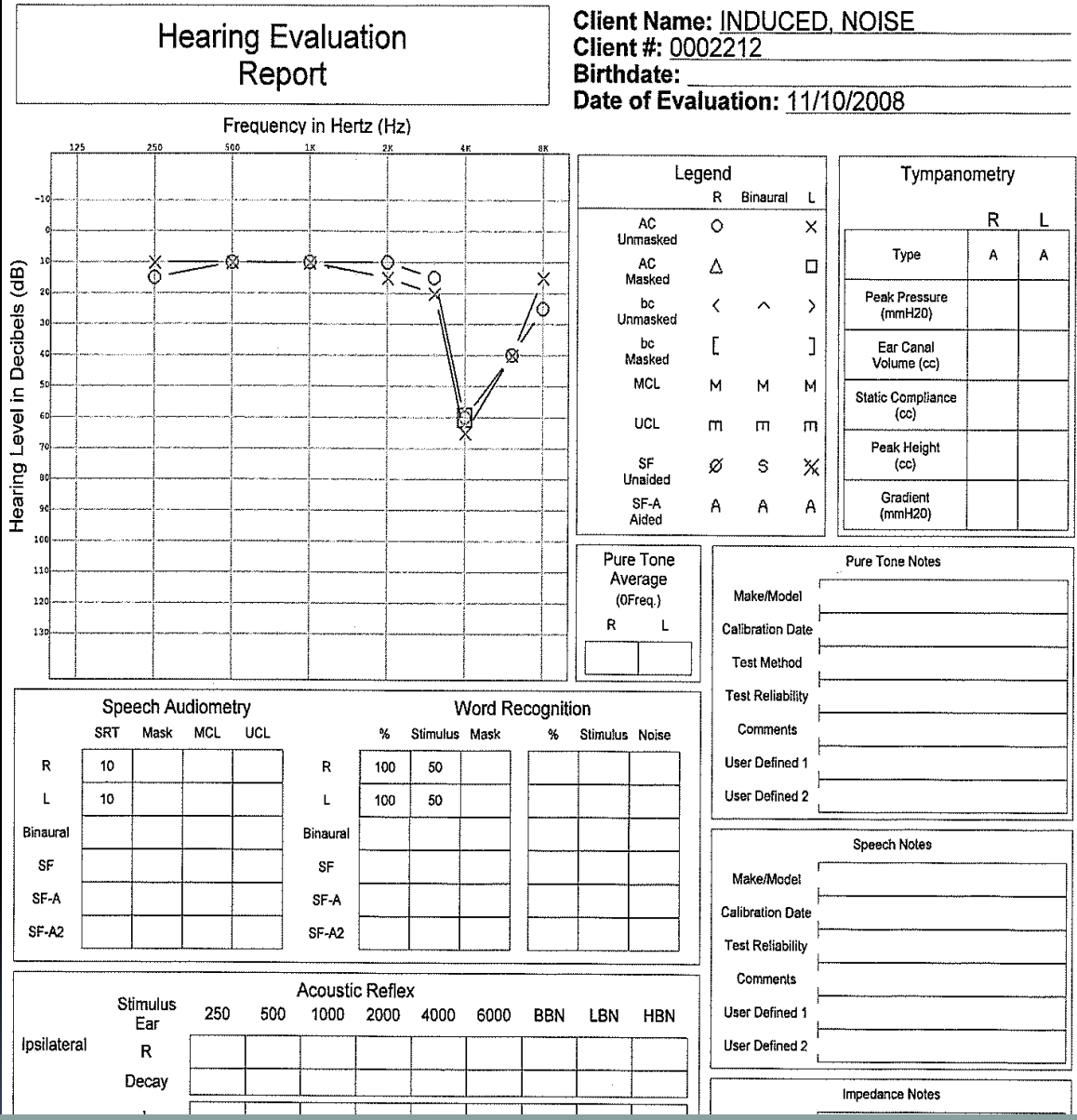


Tympano-Cochlear schematic



From Ear Diseases, Deafness and Dizziness; V Goodhill, 1979, Harper and Row, Publishers

Classic noise-induced notch at 4 kHz



Hearing Evaluation Report

Client Name: INDUCED, NOISE
Client #: 0002212
Birthdate:
Date of Evaluation: 11/10/2008

Frequency in Hertz (Hz)

125 250 500 1K 2K 4K 8K

Hearing Level in Decibels (dB)

-10 0 10 20 30 40 50 60 70 80 90 100 110 120 130

Legend

	R	Binaural	L
AC Unmasked	O		X
AC Masked	△		□
bc Unmasked	<	^	>
bc Masked	[		]
MCL	M	M	M
UCL	m	m	m
SF Unaided	Ø	S	X
SF-A Aided	A	A	A

Tympanometry

	R	L
Type	A	A
Peak Pressure (mmH20)		
Ear Canal Volume (cc)		
Static Compliance (cc)		
Peak Height (cc)		
Gradient (mmH20)		

Pure Tone Average (0Freq.)

R	L

Pure Tone Notes

Make/Model
Calibration Date
Test Method
Test Reliability
Comments
User Defined 1
User Defined 2

Speech Audiometry

	SRT	Mask	MCL	UCL
R	10			
L	10			
Binaural				
SF				
SF-A				
SF-A2				

Word Recognition

	%	Stimulus	Mask	%	Stimulus	Noise
R	100	50				
L	100	50				
Binaural						
SF						
SF-A						
SF-A2						

Speech Notes

Make/Model
Calibration Date
Test Reliability
Comments
User Defined 1
User Defined 2

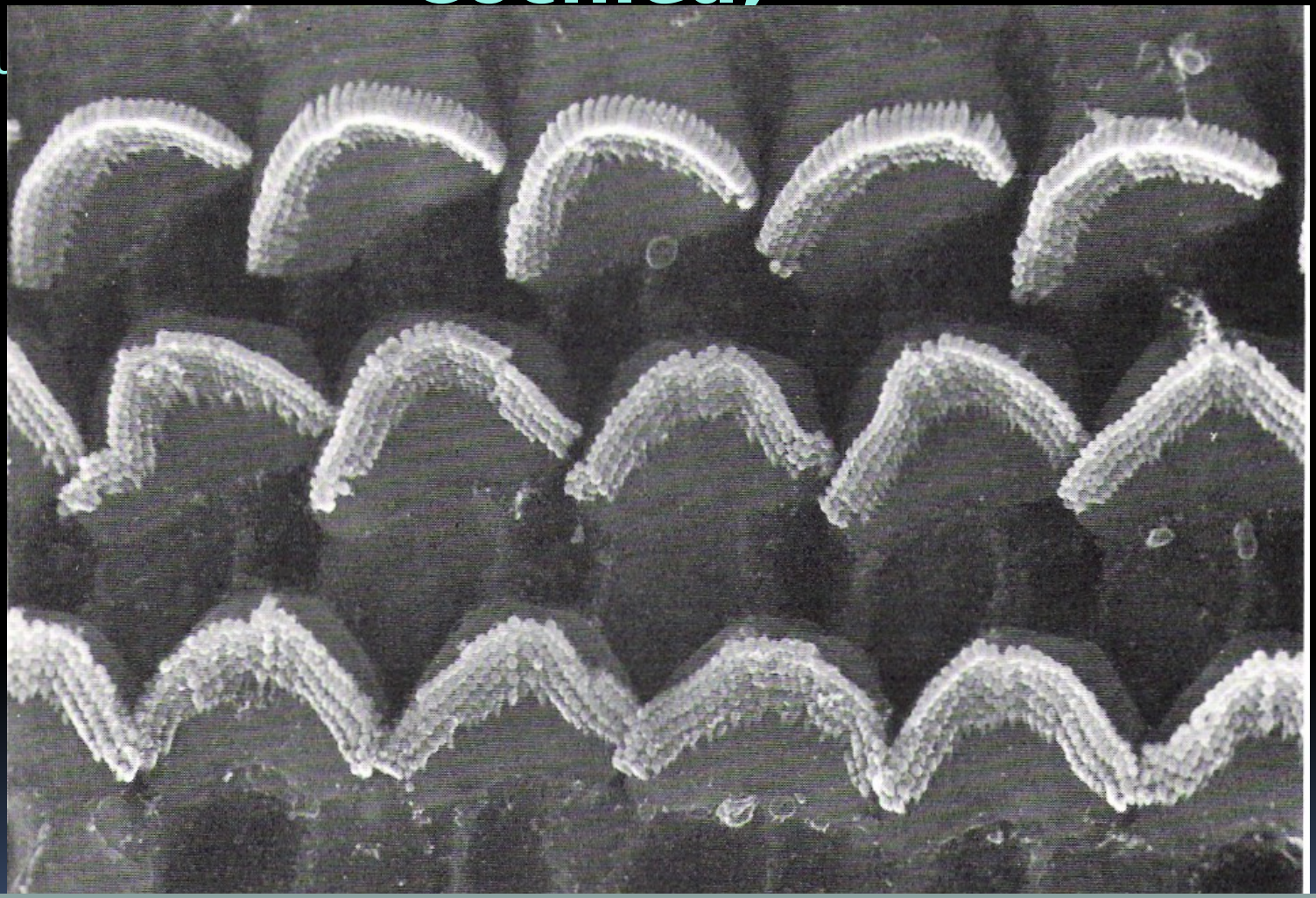
Acoustic Reflex

	Stimulus Ear	250	500	1000	2000	4000	6000	BBN	LBN	HBN
Ipsilateral	R									
	Decay									

Impedance Notes

Scanning E.M., Outer Hair Cells of Cochlea,

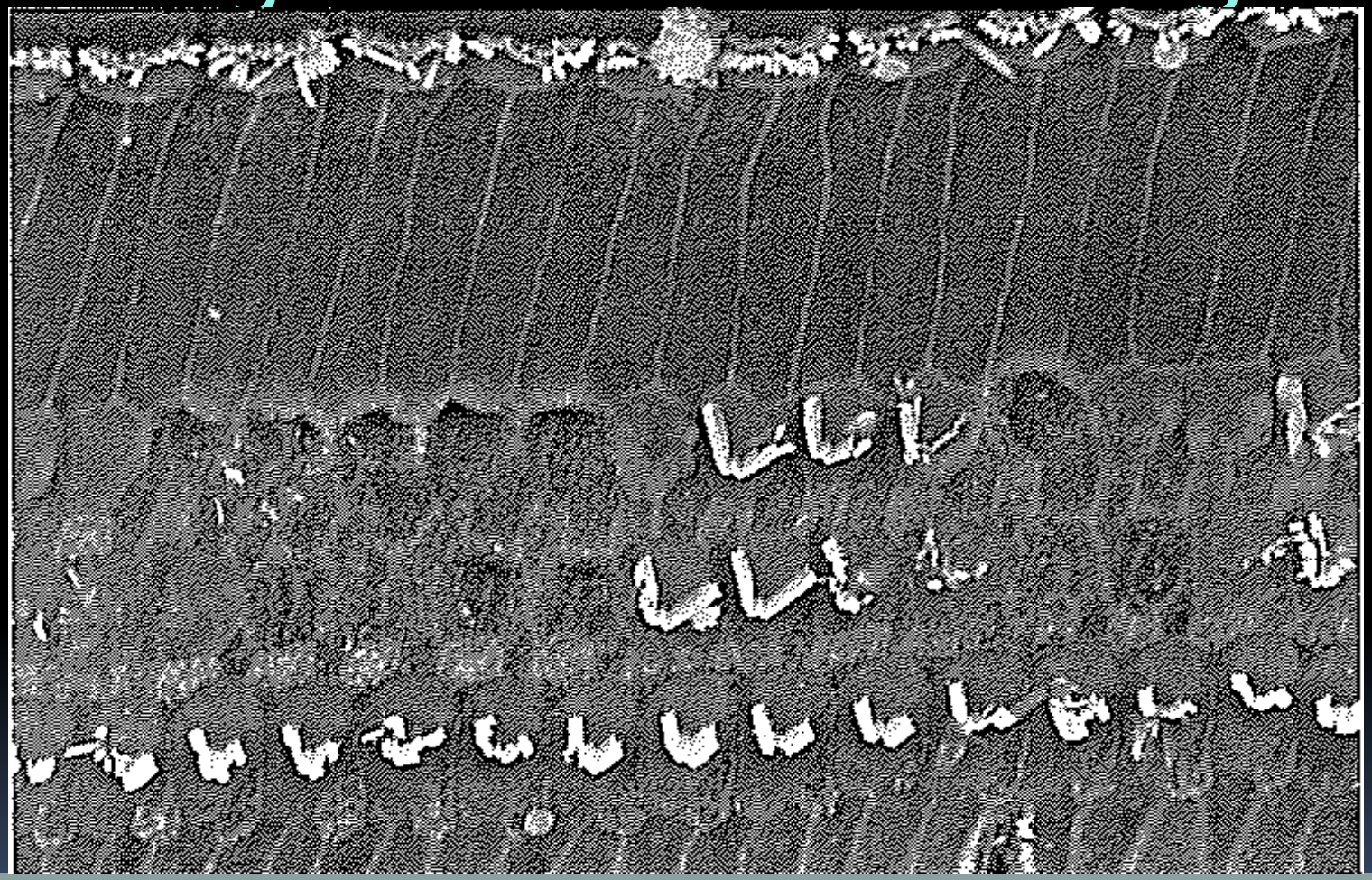
I. Hu



Outer Hair Cell damage from mild noise damage

Diseases of the Ear, Hawke and Jahn, 1987, Section 5.14

Outer Hair Cell damage from significant noise damage



Diseases of the Ear, Hawke and Jahn, 1987, Section 5.14

What did you say??

Components of Hearing Conservation Program

- Noise measurements at job site
- Engineering fixes if possible; otherwise, administrative controls on duration of exposure
- Periodic audiograms (annual for aviation)
- Hearing protection devices mandated and provided

Components of Hearing Conservation Program

- New Reference Audiogram:
  Average of 10 dB shift at 2K, 3K and 4K Hz
  Requires repeat testing after 14 hrs in noise free environment
  Special reporting requirements
  Possible ENT consultation

- Education - counseling - motivation
  - 15 dB drop between audiograms in single frequency: may indicate a problem and member should be counseled

Role of the Flight Surgeon

From OPNAVINST 5100.19E:

“.....it is incumbent upon leadership to set the right example in their personal protective practices, to enforce compliance, and to ensure HCP receives their full support.”

Role of the Flight Surgeon

From OPNAVINST 5100.19E:

i. When an audiologist or a physician confirms the positive threshold shift is permanent, the individual shall be notified in writing within 21 days of such determination.....

Role of the Flight Surgeon

From OPNAVINST 5100.19E:

Supervisors shall be notified, in writing, that the worker has experienced a decrease in hearing.

Role of the Flight Surgeon

From OPNAVINST 5100.19E:

In accordance with subparagraph C7.2.1.5.4. of Reference (s), workers shall be informed, in writing, that their supervisors are notified that they have experienced a decrease in hearing.

Role of the Flight Surgeon

-Coordinate with division officers….
-Conduct training for all hands….
-Ensure annual refresher training….
-Consult the command industrial hygiene survey……
-Schedule personnel….
-…personnel who require hearing retests …
-…ensure the certification of annual….
-Report all permanent threshold shifts…
-Enter into the web-enabled safety system…

From OPNAVINST 5100.19E:

(3) Any individual who has hearing loss in both ears in which the sum of thresholds at the frequencies of 3000, 4000 and 6000 Hz exceeds a total of 270 dB or has their reference hearing test (form DD 2215) re-established three times will not be assigned to duties involving exposure to hazardous noise until evaluated and waived by an audiologist, otologist, or occupational medicine physician.

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Role of the Flight Surgeon

The hearing conservation program is receiving increased scrutiny. There have been several working groups over the years and it continues to be a tough nut to crack.

The flight surgeon's role is critical.

The AVTs and their entry of data into DOEHRS-HC is a critical component of the program. They are a crucial resource.

Sudden Idiopathic Sensorineural Hearing Loss

- Incidence of 2-20 per 100,000 per year
- 30 dB threshold shift in 3 contiguous frequencies occurring within 72 hours.
  ~50% awaken with the loss
- Idiopathic: Viral cochleitis, microvascular event, autoimmune
- 90% with tinnitus. 20-60% with vertigo

Sudden Idiopathic Sensorineural Hearing Loss

- Potentially a diagnostic challenge. Patients frequently report that the ear feels blocked or plugged. Clinicians convince themselves that the drum looks retracted or red or……..
- You MUST remember how to use tuning forks, and more importantly, you must know where one is and you must use it!!

Sudden Idiopathic Sensorineural Hearing Loss

- Approx two thirds will have some degree of spontaneous recovery
- Prognosis is generally worse for a profound loss affecting all frequencies and in the presence of vertigo
- Recovery most likely if treatment is initiated within days

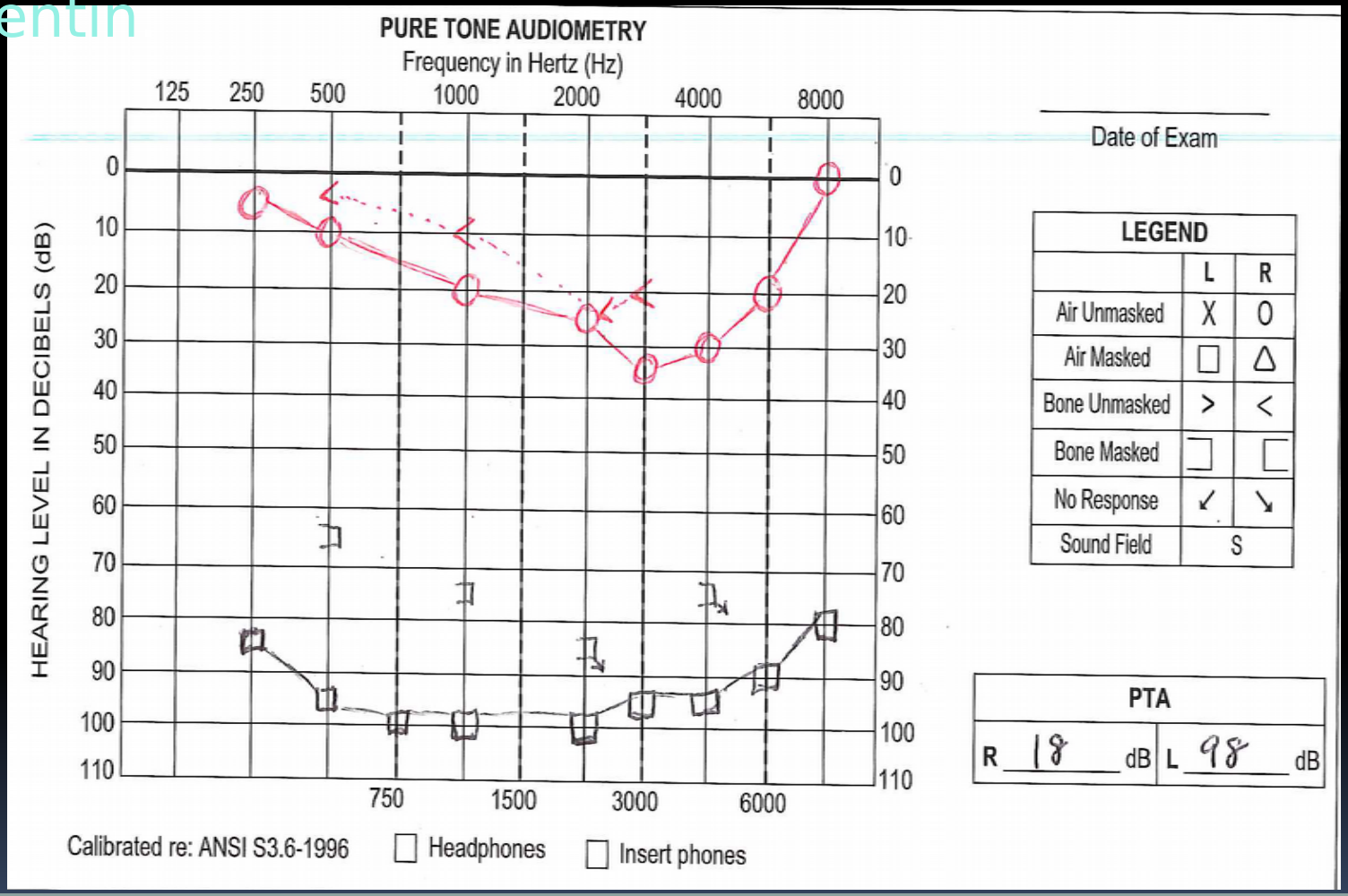
Sudden Idiopathic Sensorineural Hearing Loss

Clinical Practice Guideline from AAO-HNSF

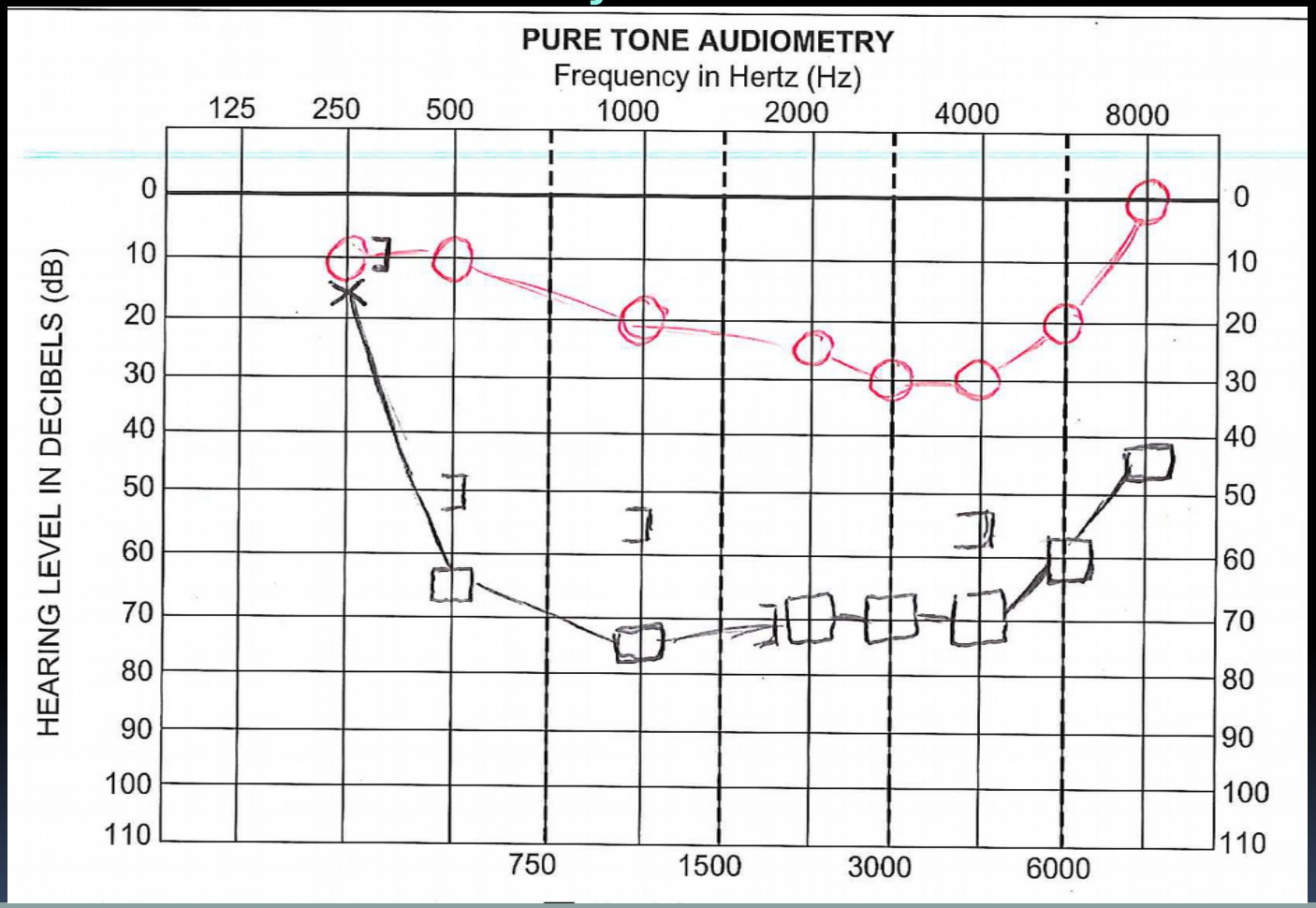
Otolaryngol Head Neck Surg. 2012 Mar;
146(3 Suppl):S1-35

-Delineate SNHL from Conductive loss.
-Recommendation for offering treatment with oral glucocorticoids
-Recommendation for consideration of trans-tympanic steroids for treatment failures
-Recommend against treating with antivirals.
-Recommend consideration of hyperbaric oxygen.
-Obtain MRI of IACs to evaluate for retrocochlear lesions

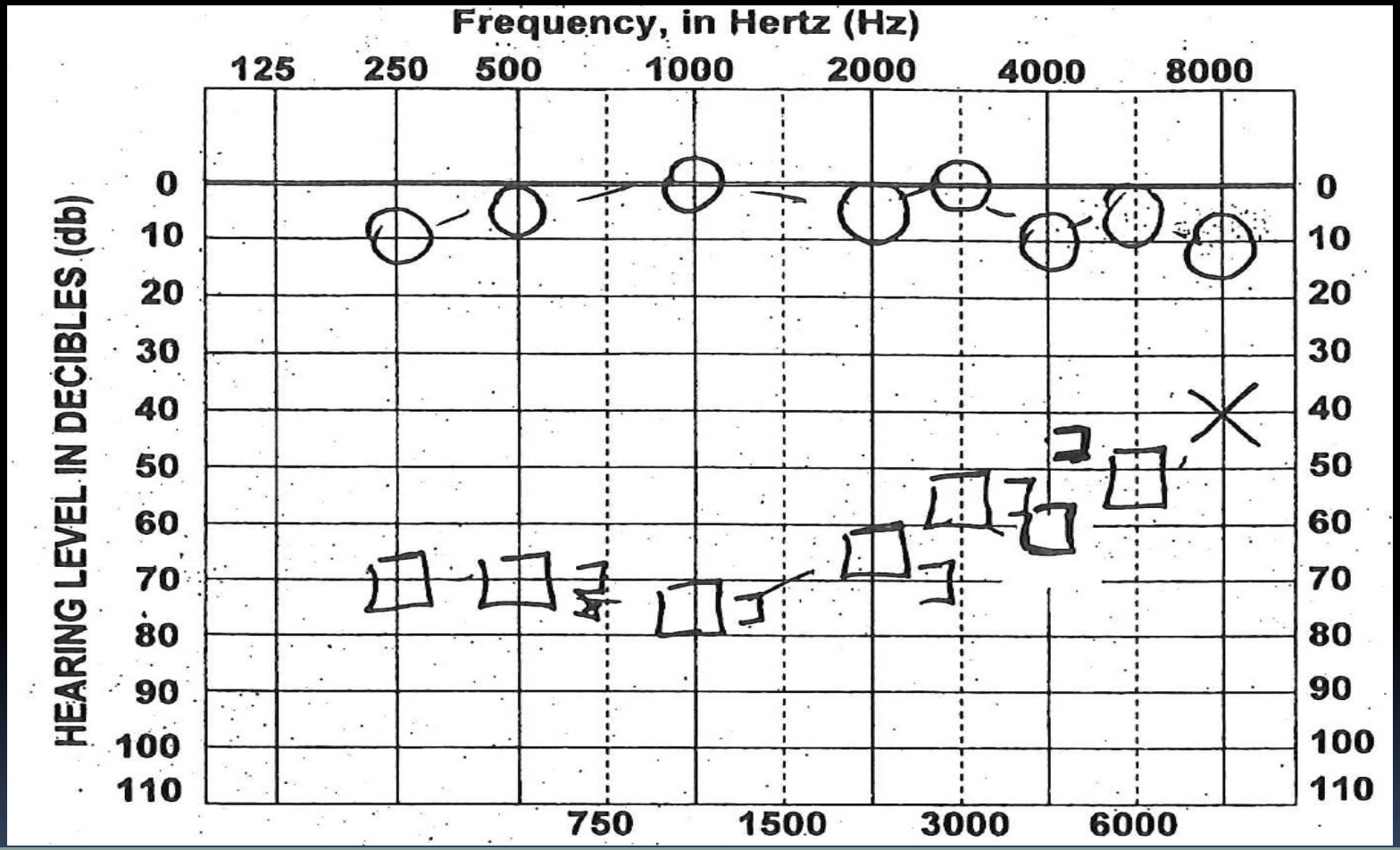
Unrecognized sudden SNHL nine days after symptom onset and treatment with ear drops, motrin and augmentin



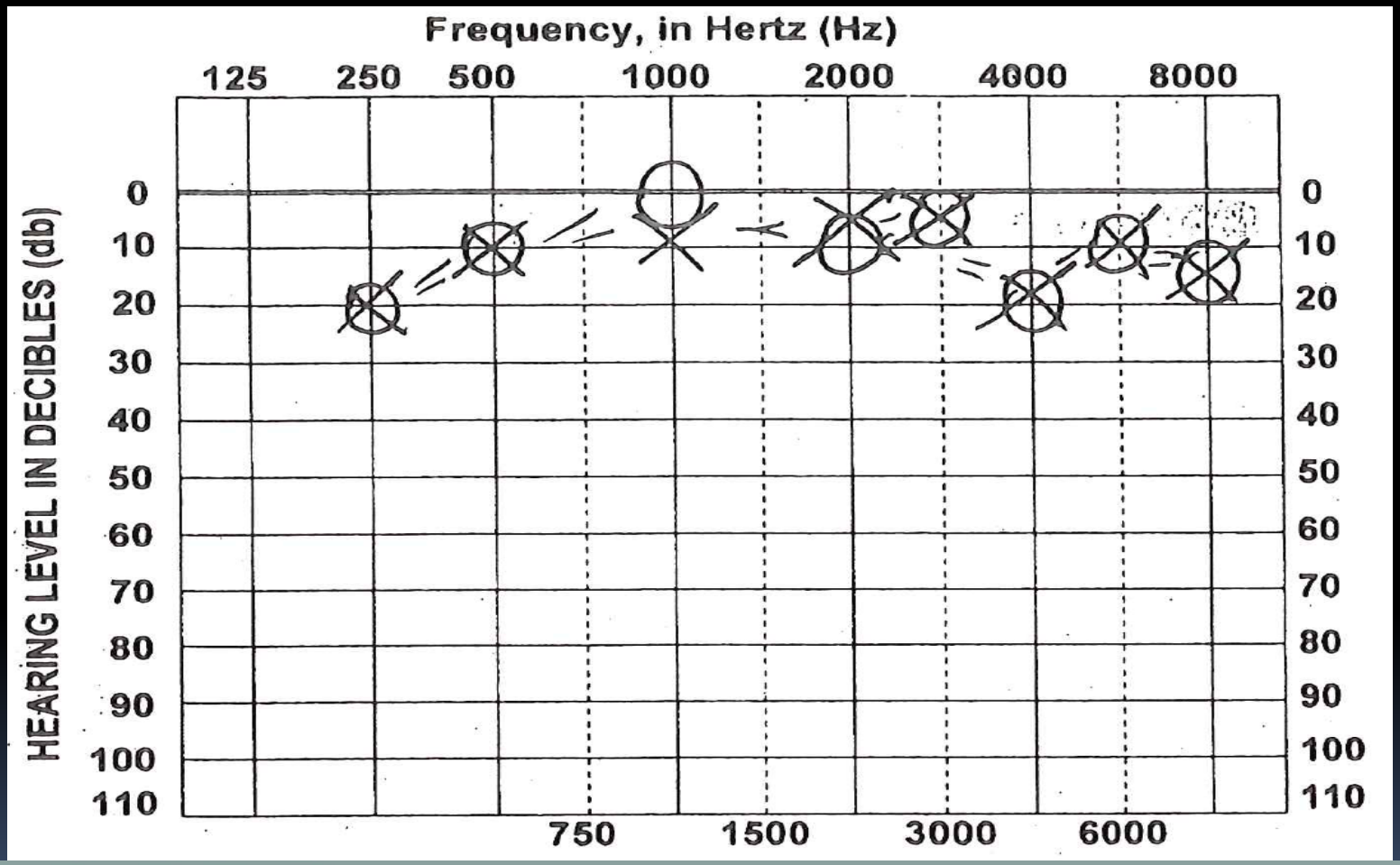
Sudden SNHL. Results after treatment with aggressive prednisone taper and three transtympanic injections of decadron that started 9 days after onset due to delay in Dx.



“I woke up this morning and could not hear in my left ear.”



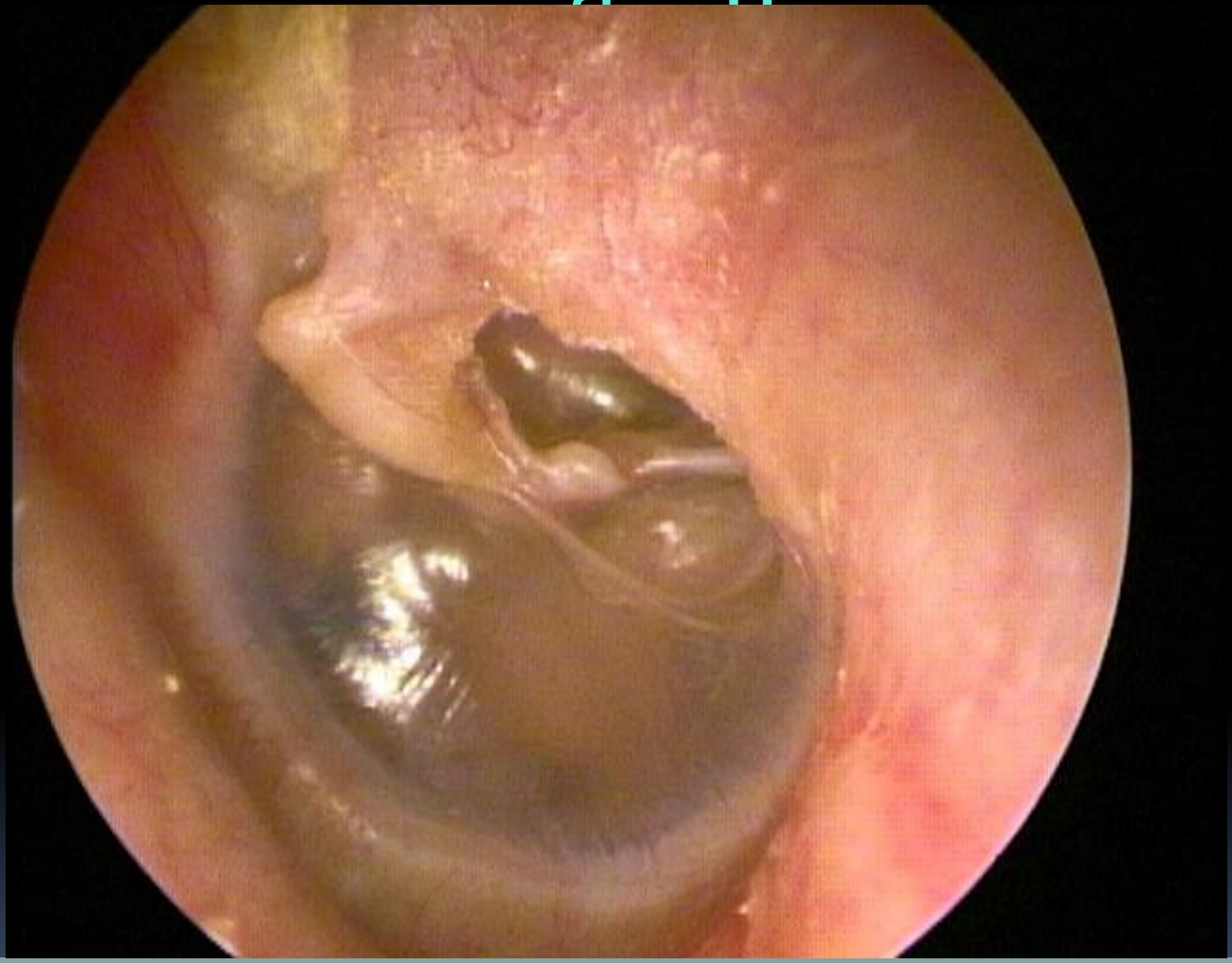
Audiogram three weeks later after aggressive oral steroid taper.



Sudden Idiopathic Sensorineural Hearing Loss

- Not everyone will have this good of a response, but you have to start with the correct diagnosis.
- Simple use of tuning forks will work for you.
- If in doubt, get a formal audiogram!

Finally, don’t forget to ignore the light



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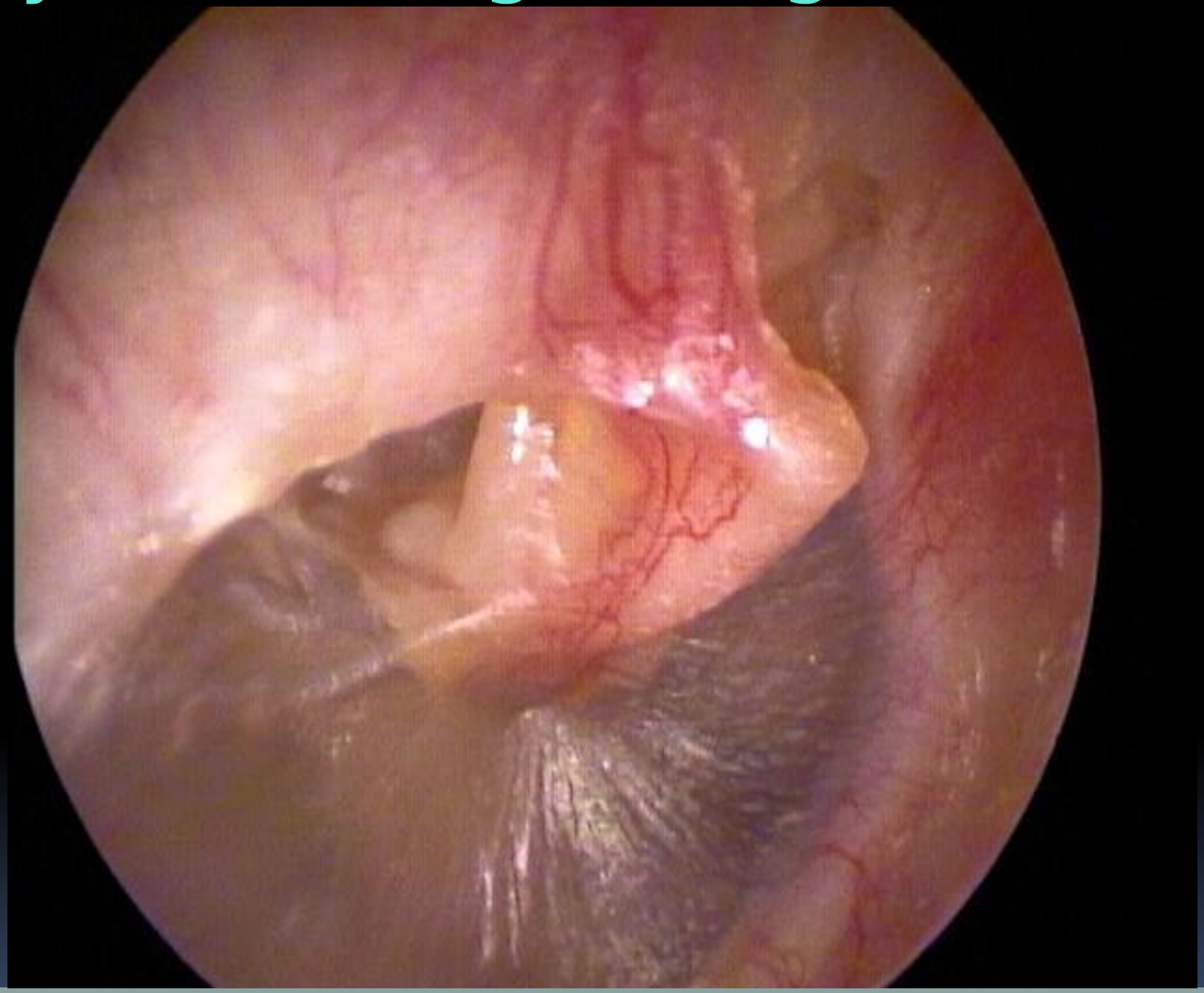

Questions?